

## **203 SOILS CONSTRUCTION - GENERAL**

### **203.01 DESCRIPTION**

These specifications include general requirements that are applicable to all types of soils construction. The work shall consist of the formation of embankments, roadbeds, base courses, and backfilling of trenches, structures, etc., to the lines, grades, and cross sections specified including trimming and finishing.

Payment for work required by this section is covered by the various pay items in these specifications.

Terms used in these specifications for the construction of soils foundations are in accordance with AASHTO M 146 except as modified in 101.03.

### **203.02 MATERIALS**

Materials for earthwork shall meet the following requirements:

Soils for embankments - 804.02

Soils for trench backfill - 804.05

Soils for base courses and structural backfill - 804.04

### **203.03 CONSTRUCTION REQUIREMENTS**

#### **(A) DENSITY AND MOISTURE REQUIREMENTS.**

**(1) DENSITY REQUIREMENTS.** The Standard Density requirements for soils, graded crushed stone and recycled materials shall be defined as the Maximum Dry (Laboratory) Density obtained by AASHTO T 180, Method D.

The in place or required density shall be determined in accordance with AASHTO T 191 or AASHTO T 238 and T 239, and is expressed as a percentage of the Standard Density. If the in place density sample contains material larger than 3/4 inch, the field density shall be adjusted for the material retained on the 3/4 inch sieve before direct comparison with the Standard Density.

The minimum in place density shall be as specified in Table 203.03, Density Requirements.

**(2) MOISTURE REQUIREMENTS.** Soils materials used in construction shall have a uniform moisture content suitable for compaction to the specified density. When necessary, the Engineer may direct that the soil be moistened or dried to obtain a suitable uniform moisture content.

If the materials are of such nature that heaving, pumping, rutting, or shearing occurs in the compacted soil under the action of the construction equipment, even though the density of the soil satisfies the above requirements, the moisture content of the soil will be considered unsatisfactory and shall be adjusted such that no heaving, pumping, rutting, or shearing occurs in the compacted soils under the action of the construction equipment.

**(B) PROOF ROLLING OF IN-SITU MATERIAL.** Prior to placing any material and after the in-situ material has been properly compacted, the grade shall be checked under the action of a loaded dump truck or similar equipment. If soft spots are detected, or pumping, rutting or heaving occurs at the subgrade, the roadbed shall be considered unsatisfactory and the soil in these areas shall be replaced to the depth indicated by the Engineer. Material used to replace unsatisfactory soil material below the subgrade shall meet the requirements of 804.04 and shall be compacted to the density specified in Table 203.03. Where soft spots occur in base course the soil in these areas shall be replaced by material meeting the

requirements of 804.04, compacted to the density specified in Table 203.03. When shallow utilities or similar construction conditions prohibit proof rolling or correction by replacement and the soils foundation is not suitable for hauling over directly, the Contractor shall provide approved means for protecting the soils foundation against damage caused by equipment moving over it.

**(C) FORMATION OF EMBANKMENTS AND BASE COURSES.** All excavated material meeting the applicable requirements of 203.02 may be used in the formation of any embankment, base course shoulder, or similar construction. All other materials shall be disposed of outside the limits of the project.

During the construction, the embankment and base shall be maintained in such condition that it will be well drained at all times and the grade shall be shaped and rolled to drain when precipitation is imminent and at the end of each day.

After precipitation, all soft wet material on the grade shall be removed at the Contractor's expense before additional material is placed. No fill shall be placed in natural drainage ditches until necessary pipes or culverts have been installed.

No material used in embankments or base courses shall be placed in a loose lift thickness in excess of 6 inches. Each loose lift shall be compacted to the density requirements of Table 203.03 before another loose lift is placed. Frozen material shall not be used nor shall material be placed on frozen embankment foundation, embankment, or base course.

Compacting equipment shall meet the requirements of 902. Any portion of the embankment foundation, embankment, or base course which is not accessible to the roller shall be compacted to the specified density by an approved mechanical tamper. Puddling or jetting is prohibited. The Engineer may permit compaction with types of equipment other than those specified above, provided he determines that use of the alternate equipment will consistently produce specified densities. The Engineer's permission shall be in writing and shall set forth the conditions under which the equipment is to be used.

The Contractor shall be responsible for the stability of all constructed soils foundations and shall replace any portions which in the opinion of the Engineer have become displaced or disturbed due to careless or negligent work, or to damage resulting from any kind of storms and not attributable to the unavoidable movement of the natural underlying ground on which the constructed soils foundation rests. No pavement materials shall be placed on any base, roadbed, or soils foundation until it has been approved by the Engineer.

**TABLE 203.03  
DENSITY REQUIREMENTS**

DESCRIPTION	MINIMUM DENSITY REQUIRED, PERCENT OF THE MAXIMUM DRY DENSITY
Embankments, Trench Backfill and Backfill for undercut areas	93 percent per each layer up to 6 inches below subgrade.  95 percent for top 6 inch layer below subgrade.  95 percent for full depth of embankments in confined areas where the use of clean sand is permitted.
Top 6 inches of In-situ soil	95 percent; and 93 percent for areas to be covered with at least 6 inches of embankment fill.
Upper 6 inches of Roadbed (Top 6 inches below subgrade)	93 percent under curb, gutter, sidewalk, driveway entrances and alley entrances.  95 percent under roadway pavement areas.  100 percent if full depth bituminous concrete pavement is used.
Existing and New Soils Base Course, backfill for undercut areas and crushed stone base	95 percent for portland cement concrete base, pavement or sidewalk.  100 percent for bituminous concrete pavement.
Structural Backfill	95 percent.